

# Headquarters Highlights

## Lab delivers second issue of *Technology Horizons*

WRIGHT-PATTERSON AFB, OHIO — Staying on the cutting edge of Air Force technology and research is as easy as opening the mailbox — the second issue of *AFRL Technology Horizons* magazine takes the technology to subscriber doorsteps.

The magazine, which is patterned after *and* arrives to subscribers coupled with *NASA Tech Briefs*, reaches 200,000 subscribers from government, academia and industry.

Every issue of the magazine contains many types of articles, the most significant being technical articles submitted by AFRL scientists and engineers. Some of the technologies that are featured this quarter include:

- The development of microtubes that are so small that dozens fit into the diameter of a single strand of human hair. Dr. Wes Hoffman of Edwards, AFB, Calif. has pioneered this microtube that can be crafted from virtually any material with precisely controlled composition, diameter, wall thickness, and in varying lengths. The microscopic tubes may find application in a wide range of mechanical devices, from biosensors to accelerometers.
- The introduction of a new approach for simultaneous video/audio communication. This communication currently involves “multiplexing,” which divides a transmission channel into smaller sub-channels suitable for voice, video, data and control signals. The new approach, which is championed by AFRL’s Information Directorate, employs a wavelet transform algorithm for both video and audio compression. A one-dimensional audio signal is converted into a 2-dimensional image, which results in identical video and audio signals. This allows video and audio images to be sent in sequence via the same channel, making full use of the communication channel.
- The successful demonstration of fluid film or hydrostatic bearings for rotor support in cryogenic turbopumps. These bearings, which were demonstrated by AFRL’s Propulsion Directorate, will replace conventional roller element bearings. The Air Force considers this one of its enabling technologies that could help increase payload weight to orbit by as much as 33 percent, while cutting the failure rate in half as compared to current upperstage engines. The hydrostatic bearings, which have applications in commercial refrigeration units in addition to rocket engines, allow higher rotating speeds with a significant reduction in bearing wear.
- The opening of an advanced laser laboratory. The Ultrafast Physics Lab, located at Wright-Patterson AFB, will help develop revolutionary materials and pursue new manufacturing technologies in micro-electromechanical systems and nano-electromechanical systems. The lab recently demonstrated ultrafast, holographically written microstructures using a two-photon absorbing dye. The Air Force is using this technique to investigate biological structures and proteins.

*Horizons* will also contain feature articles, sections and departments that focus on technology transfer, upcoming or recent AFRL conferences, specific directorates, requests for proposals, facilities, broad agency announcements, interesting commercial applications and other topics.

The technical articles that are published will be supplemented by a Technical Support Package (TSP). The package will include: official reports; white papers; previously published articles; status reports; research papers; or any other published product that provides readers with additional information on the subject matter. The TSPs will be available to readers via the World Wide Web at <http://www.afrlhorizons.com>.

The laboratory also provides a technology clearinghouse for readers interested in any of the technical articles, programs, or organizational information that appear in the magazine. The TECH CONNECT hotline can be reached at (800) 203-6451.

*AFRL Technology Horizons* Program Manager Susan Wapelhorst said the debut of the magazine has already begun to enhance AFRL's technology transfer and technology transition programs by relaying research and development activities going on within the lab. @